

OUTBREAK OF *TINEA CAPITIS* BY *Trichophyton tonsurans* and *Microsporum canis* in Niterói, RJ, Brazil*

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SUMMARY

18 girls from an orphanage (Orfanato Santo Antônio) in Niterói presented tinea capitis due to *Trichophyton tonsurans* (15 cases — 83.3%) and *Microsporum canis* (3 cases — 26.7%). Comments are made about clinical, mycological and therapeutic aspects of this microepidemy.

KEY WORDS: Dermatophytosis; Epidemy; Griseofulvin; *Microsporum canis*; *Trichophyton tonsurans*; Tinea capitis.

INTRODUCTION

Dermatophytosis is an important problem of public health in Brazil²¹. The principal agent of this infection worldwide as well as in this country is *Trichophyton rubrum*, *T. mentagrophytes*, *T. tonsurans*, *Microsporum canis*, and *Epidermophyton floccosum* are also commonly isolated species. *M. gypseum* (complex), *M. audouinii*, *T. verrucosum*, *T. violaceum*, *T. megninii*, *T. schoenleinii*, *T. concentricum*, occur less frequently, the two latter causing endemic infection in certain areas of the country. *M. cookei*,

M. nanum, *M. persicolor*, *T. simii* are geophylic dermatophytes occasionally isolated in Brazil^{6, 7, 8, 9, 15, 27}.

In the states located above the Tropic of Capricorn, *Trichophyton tonsurans* is an important agent of dermatophytosis and it seems to be well adapted to the environmental conditions of the Northern and Northeastern areas of Brazil, including the Amazon region^{7, 9, 18} where it is considered to be endemic and the most impor-

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tant agent of tinea capitis⁹. *Trichophyton tonsurans* is also prevalent in other parts of Latin America, including Mexico, Puerto Rico and El Salvador^{4, 18}. This introduced dermatophyte, often brought by immigrants, may become the predominant agent of tinea capitis in regions or countries where the fungus has been imported^{4, 18, 19}.

In the southern part of Brazil, the principal agent of tinea capitis is *M. canis*, a zoophilic dermatophyte that causes cat ringworm and also frequently infects dogs^{4, 17, 20, 27}. In Brazilian territory, tinea capitis is also caused by *T. mentagrophytes*, *T. rubrum*, *T. verrucosum*, *T. violaceum*, *M. gypseum*, and *M. audouinii*^{9, 15, 27}.

Tinea capitis is the most common cutaneous fungal infection in children. Clinical infections are often due to one of two species: *M. canis*, which is often isolated from very young children, and *T. tonsurans*, which accounts for 90% of all cases of tinea capitis infecting children from kindergarten level and older^{5, 17}.

The way in which the fungus invades the hair shaft determines the type of infection seen clinically. In *M. canis* infection, spores coat the outer surface of the hair shaft (ectothrix infection) and Wood's light reveals a green blue colour. In *T. tonsurans* infection, spores are produced within the hair shaft (endothrix infection), resulting in brittle hairs that break off just above the surface of the scalp. Fluorescence with Wood's lamp is negative. The shed hairs contain arthroconidia that remain viable in a non living substrate and may contaminate other people, thus spreading the infection. Tinea capitis by *T. tonsurans* has already reached epidemic proportions in Brazil, México, Puerto Rico and the United States^{4, 22, 24}.

We report a series of 18 patients from an orphanage for girls in Niterói, RJ, Brazil, with "tinea capitis" by *T. tonsurans*¹⁵ and *M. canis*³.

PATIENTS AND METHODS

In a screening survey for tinea capitis in an orphanage for girls, Orfanato Santo Antônio, in Niterói, RJ, Brazil, 80 children were examined in the period from June 1989 to January 1990.

They were from low social-economic backgrounds, between 6 and 13 years of age and of mixed racial origin.

After clinical examination, hairs and skin scrapings were collected from 26 children with suspected infection. 20% potassium hydroxide preparations were submitted for microscopic examination. Cultures were obtained on Mycosel agar (BBL) and Sabouraud dextrose agar (Merck). Species isolated were identified by criteria established by REBELL & TAPLIN (1979)¹⁰.

RESULTS

Clinical examinations revealed scalp lesions in 26 of the 80 girls in the orphanage (32.5%). Mycological examinations and cultures confirmed the diagnosis of "tinea capitis" in 18 of the 26 suspected cases (69.2%). Clinical appearances varied considerably (Table 1).

Direct examination demonstrated endothrix infection in 15 cases and ectothrix infection in 3 patients. Endothrix infections were caused by *Trichophyton tonsurans*, the predominant organism in this outbreak, having been isolated from 15 of the 18 infected girls (83.3%). *M. canis* was the isolated etiologic agent of ectothrix cases (3/18 — 16.7%). Most endothrix infections were classified clinically as types 1 or 2, and ectothrix infections as types 3 or 4, overlap having been observed in 6 patients (6/18 — 33.3%). Lesions were limited to the scalp in all cases. Most children had already had scabies and/or pediculosis (lice), treated previously.

Therapy

Microsize griseofulvin was administered at a dosage of 10 mg/kg of body weight per day with a meal. The children were seen when therapy was started after the confirmation of the diagnosis by direct potassium hydroxide examination. They were seen again at follow-up visits 8 and 12 weeks later. Mycological examinations were performed at each visit. Within 8 weeks signs of infection were no longer observed, when therapy was withdrawn, and no relapse or reinfection seen in a 2 year follow-up period.

TABLE 1
Focus of tinea capitis in an orphanage for girls in Niterói, RJ, Brazil.

Identification	Age (in years)	Ethnic origin	Time of evolution	Clinical appearance	Fungus isolated
AT	9	b	3 months	3	<i>M. canis</i>
BA	7	w	3 months	2	<i>M. canis</i>
CM	8	w	2 months	4	<i>M. canis</i>
DT	9	m	4 months	4	<i>T. tonsurans</i>
EJ	7	m	4 months	3	<i>T. tonsurans</i>
FD	7	m	1 year	2	<i>T. tonsurans</i>
GC	9	b	5 months	2	<i>T. tonsurans</i>
HF	11	b	5 months	2	<i>T. tonsurans</i>
IL	7	w	1 year	3	<i>T. tonsurans</i>
JP	8	w	6 months	2	<i>T. tonsurans</i>
KF	8	w	6 months	2	<i>T. tonsurans</i>
LV	6	m	6 months	3	<i>T. tonsurans</i>
MM	8	m	1 month	3	<i>T. tonsurans</i>
NA	7	b	4 months	2	<i>T. tonsurans</i>
OV	8	w	5 months	1	<i>T. tonsurans</i>
PB	9	m	3 months	1	<i>T. tonsurans</i>
QF	10	w	6 months	1	<i>T. tonsurans</i>
RR	7	b	1 month	5	<i>T. tonsurans</i>

Ethnic origin: b = black; w = white; m = mixed racial origin.

Clinical appearance: 1 = No or minimal hair loss, mild scaling; 2 = More extensive hair loss (more than one patch greater than 2 cm), mild scaling; 3 = More extensive hair loss, and moderate erythema and scaling; 4 = Extensive hair loss, severe erythema and scaling, crust formation; 5 = Highly inflammatory patches of hair loss, pustule formation, crusts (kerion).

DISCUSSION

The first two girls in our study were seen at the Dermatology Division of the Centro de Saúde Carlos Antônio da Silva in June of 1989. One of them presented with "black dot" tinea capitis caused by *T. tonsurans* and the other had gray patch ringworm by *M. canis*. The latter had just come from home leave where she used to play with a sick dog, but material from this animal could not be obtained for examination. The first girl had contact with her sister who had a scalp condition that responded to griseofulvin therapy in March 1989. The sister was also at the orphanage, but when examined, had no lesions and repeated mycological examinations were negative.

As these children were from an orphanage, and *Trichophyton tonsurans* is an anthropophi-

lic dermatophyte, capable of remaining viable in keratinised tissue⁴, all the children in that institution were examined. Living in close confinement (orphanage) helped spread infestation (pediculosis and scabies), and infection (tinea capitis)⁴.

Epidemics of tinea capitis caused by *Trichophyton tonsurans* have been reported previously in Brazil even in areas where this dermatophyte is considered to be rare^{4, 15}. This fungus is reported to be predominant among blacks^{12, 19}, but it is also seen among individuals of Hispanic backgrounds¹⁶. In our series there was no particular racial predominance and one third of the patients were of mixed racial origin.

Significant clinical overlap between endo-thrix infections by *T. tonsurans* and ectothrix infections by *M. canis* was also observed in a series of 22 tinea capitis patients infected by *M. canis*¹²,

*T. tonsurans*⁹ and *T. mentagrophytes* (var. *mentagrophytes*)¹ studied in Niterói²⁷. The clinical manifestations of tinea capitis by *T. tonsurans* were highly variable and nonspecific. They ranged from acute kerion (Fig. 1) to localized alopecia (Fig. 2) to a minor degree of scaling without appreciable alopecia (Fig. 3), some cases being virtually indistinguishable from dandruff on the basis of simple clinical examination (Fig. 4). *Microsporium canis* infection tended to be inflammatory (fig. 5). The immune response of each patient with T-helper/T-suppressor lymphocyte interactions may play a role in the variability of clinical signs in tinea capitis by *T. tonsurans*^{3, 22}, atypical cases having also been reported in *M. canis* infections¹. A high index of suspicion together with acquisition of suitable material for mycologic examination were important in making the diagnosis, especially in atypical cases.



Fig. 3 — Non inflammatory confluent circular areas of alopecia caused by *Trichophyton tonsurans*.



Fig. 4 — *Trichophyton tonsurans* scalp infection with mild scaling and minimal hair loss, mimicking seborrheic dermatitis; associated pediculosis (arrow).

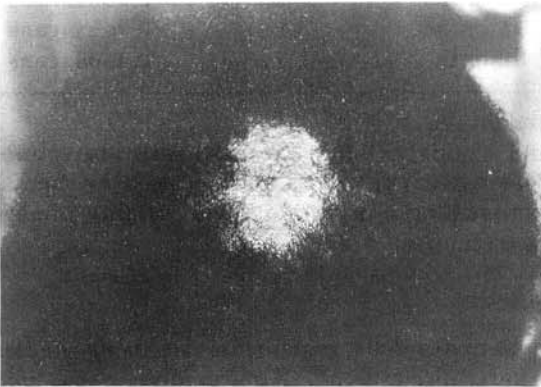


Fig. 1 — *Trichophyton tonsurans* kerion with suppuration, crusting and alopecia.



Fig. 2 — Hair loss, moderate scaling of the scalp due to *Trichophyton tonsurans* infection.



Fig. 5 — Scaling, crust formation and hair loss in tinea capitis caused by *Microsporium canis*.

The hair stubs or "black dots" must be examined and cultured, a small-bore sterile needle

often being necessary to prise them from the scalp. Potassium hydroxide examination of skin scrapings of scaly lesions may be helpful if "black dot" hair stubs are difficult to locate²². Cultures are important for establishing the diagnosis and selecting therapy.

Griseofulvin is effective in treating dermatophytosis, being frequently used for scalp infections and onychomycosis. However, although rare, treatment failures are seen^{10, 13, 25}. In these cases itraconazole is a promising drug as initial of therapy reports in *Trichophyton tonsurans* infection have shown good response^{14, 23}. Griseofulvin is usually indicated in all forms of *T. tonsurans* as well as in *M. canis tinea capitis*^{13, 22}, and good therapeutic results were obtained with it, no side effects having been observed.

Considering the increasing incidence of scalp infections due to *Trichophyton tonsurans*, it is important to keep in mind its often confusing clinical signs. It should be considered as a possible diagnosis in any patient with hair loss, scaling and/or inflammation on the scalp. Mycological tests should be performed in every patient in whom the diagnosis is suspected, including adults^{2, 22}. *Trichophyton tonsurans* infection can continue into adulthood, the clinical presentation of adult disease often mimicking seborrheic dermatitis^{2, 26}. Classical black-dot type can also be seen in these patients²². Adults with scalp ringworm and asymptomatic adult carriers of *T. tonsurans* may provide a source for continued reinfection in children, examination of all household members being recommended^{2, 11}.

This outbreak was caused by two different species and fungi were probably introduced among orphanage girls from different sources. In a focus of infection it is uncommon to find more than one species to be causative agent, as in the series described here.

RESUMO

Microepidemia de tinha do couro cabeludo por *Trichophyton tonsurans* e *Microsporium canis* em Niterói, RJ, Brasil.

18 meninas internas do Orfanato Santo Antônio em Niterói apresentaram tinha do couro

cabeludo causada por *Trichophyton tonsurans* (15 casos — 83,3%) e *Microsporium canis* (3 casos — 26,7%). São discutidos aspectos clínicos e terapêuticos desta microepidemia.

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